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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/880,632	06/12/2001	Wenting Tang	HP-10012351	5911
7590 05/02/2007 HEWLETT-PACKARD COMPANY Intellectual Property Administration P.O. Box 272400 Fort Collins, CO 80527-2400			EXAMINER TODD, GREGORY G	
			ART UNIT 2157	PAPER NUMBER
			MAIL DATE 05/02/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

09/880,632

Applicant(s)

TANG ET AL.

Examiner

Gregory G. Todd

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 February 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. This office action is in response to applicant's amendment filed, 08 February 2007, of application filed, with the above serial number, on 12 June 2001 in which claim 12 has been amended. Claims 1-29 are pending in the application.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Albert et al (hereinafter "Albert", 6,775,692) in view of Brendel et al (hereinafter "Brendel", 5,774,660).

Albert teaches the invention, substantially, as claimed including TCP request forwarding and monitoring (at least Abstract).

As per Claim 1, Albert teaches a communication network, a method of TCP state migration comprising the steps of:

- a) establishing a communication session between a client and a front-end node, said front-end node accessing a plurality of back-end web servers forming a web server cluster that contains content (at least col. 7, lines 36-60; forwarding agents connecting client/servers);

b) receiving a HTTP request from said client at said first BTCP module (at least col. 15 line 36 - col. 16 line 15; col. 8, lines 17-25; http from client);

d) extending said communication session to said selected back-end web server (at least col. 14 line 65 - col. 15 line 27; SYN/ACK packets);

e) sending said HTTP request to said selected back-end web server (at least Fig. 5; data to host/server);

f) wherein packets received at said BIP module from said client are forwarded to said selected back-end web server (at least Fig. 5; col. 14, lines 1-15; forwarding data packet); and

g) terminating said communication session at said front-end node after said HTTP request is fully processed (at least col. 32, lines 46-63; connection ends).

Albert fails to explicitly teach a first bottom TCP (BTCP) module located below a first TCP module in a first operating system at said front-end node; c) parsing said HTTP request to determine which back-end web server, a selected back-end web server, in said plurality of back-end web servers can process said HTTP request, said selected back-end web server not said front-end node; handing-off an initial TCP state of said first BTCP module to said selected back-end web server; and switching a bottom IP (BIP) module, located below an IP module at said front-end node at said front-end node to a forwarding mode. However, the use and advantages for using such a system is well known to one skilled in the art at the time the invention was made as evidenced by the teachings of Brendel. Brendel teaches TCP state migration wherein a TCP connection is made between a client and the load balancer (front end node), and

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subsequently transfers the connection to an assigned server (at least col. 11 line 51 – col. 12 line 63) and modified IP input and output modules (see col. 15, lines 11-39; col. 15 line 63 – col. 16 line 20). Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to incorporate the use of Brendel's system into Albert as this would further enhance Albert's system for use in load balancing and allowing the state of the TCP connection to be shared with the server so as to, in essence, remove the load balancer (front end node) from the TCP connection, thus improving the load balancing of Albert as it also allows delayed load balancing so that the backend servers of Albert do not need to have the same content (see Brendel col. 11, lines 28-36).

As per Claim 2, the method as described in Claim 1, wherein said content is partially replicated between each of said plurality of back-end web servers (at least col. 3, lines 22-57; clustered servers).

As per Claim 3, the method as described in Claim 1, wherein said back-end web server includes a second BTCP module that is located below a second TCP module in a second operating system at said selected back-end web server (at least Fig. 3; col. 11 line 30 - col. 12 line 5).

As per Claim 4, the method as described in Claim 1, wherein said initial TCP state is associated with said communication session, said communication session established for the transfer of data contained within said content to said client (at least Fig. 5; col. 12, lines 22-35; TCP connection).

As per Claim 5, the method as described in Claim 4, wherein said step d) comprises the further steps of:

 sending a SYN packet to said selected back-end web server (at least col. 12 line 23 - col. 13 line 51),

 said SYN packet intercepted by a second BTCP module (at least col. 12 line 23 - col. 13 line 51; received by forwarding agent),

 said SYN packet originally sent from said client to said front-end node in requesting said communication session (at least col. 12 line 23 - col. 13 line 51),

 said SYN packet stored at said first BTCP module (at least col. 12 line 23 - col. 13 line 51);

 including an initial sequence number within said SYN packet that enables said second BTCP module to understand proper TCP state of said first BTCP module said communication session (at least col. 12 line 23 - col. 13 line 51; col. 19, lines 12-15);

 receiving a SYN/ACK packet from said selected back-end web server, said SYN/ACK packet updated by said second BTCP module to reflect said proper TCP state of said first BTCP module (at least col. 12 line 23 - col. 13 line 51); and

 sending an ACK packet from said first BTCP module to said selected back-end web server, said ACK packet originally sent from said client to said front-end node in establishing said communication session (at least col. 12 line 23 - col. 13 line 51; TCP connection being established between the client, forwarding agent and server).

As per Claim 6, the method as described in claim 1, wherein said method comprises the further step of:

sending response packets from said selected back-end web server to said client in a communication path that does not include said front-end node by changing headers of said response packets such that it appears that the source of said response packets is said first BTCP in its proper TCP state (at least col. 7 line 60 - col. 8 line 11; modifying addresses in header).

As per Claim 7, the method as described in Claim 1, wherein step g) comprises the further steps of:

intercepting TCP control packets from a second TCP module located at said selected back-end web server at said second BTCP module (at least Fig. 13; col. 12 line 23 - col. 13 line 51; col. 32, lines 46-63; TCP connection ending between the client, forwarding agent and server);

sending said TCP control packets to said first BTCP module from said second BTCP module (at least Fig. 13; col. 12 line 23 - col. 13 line 51; col. 32, lines 46-63; TCP connection ending between the client, forwarding agent and server);

sending said TCP control packets to said client from said first BTCP module (at least Fig. 13; col. 12 line 23 - col. 13 line 51; col. 32, lines 46-63; TCP connection ending between the client, forwarding agent and server); and

terminating said communication session at said front-end node and said back-end web server (at least Fig. 13; col. 32, lines 46-63; connection ends).

As per Claim 8, the method as described in Claim 1, wherein said front-end node and said plurality of back-end web servers comprise a web site, said front-end node

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providing a virtual IP address for said web site (at least col. 28, lines 34-38; col. 4, lines 43-52; col. 9, lines 45-58; web virtual IP addresses).

As per Claim 9, the method as described in claim 8, wherein said front-end node, and said plurality of back-end web servers are coupled together by a local area network (at least Fig. 2; col. 7, lines 37-60).

As per Claim 10, the method as described in Claim 8 wherein said front-end node and said plurality of back-end web servers are coupled together by a wide area network (at least Fig. 2; col. 7, lines 37-60).

Claims 11-29 do not substantially add or define any additional limitations over claims 1 –10 and therefore are rejected for similar reasons.

Response to Arguments

4. Applicant's arguments filed 08 February 2007 have been fully considered but they are not persuasive.

Applicants argue substantially, that Brendel fails to teach handing-off an initial TCP state of said first BTCP module to said selected back-end web server/ second BTCP module, nor first and second BTCP modules and BIP modules.

In response, Brendel teaches TCP state migration wherein a TCP connection is made between a client and the load balancer (front end node), and subsequently transfers the connection to an assigned server (at least col. 11 line 51 – col. 12 line 63), wherein a load balancer transfers (hands off) the TCP connection and state to the assigned server. Brendel also teaches modified IP input and output modules (see col.

15, lines 11-39; col. 15 line 63 – col. 16 line 20), either of which can be 'below' the other, and further teaches using an IXP protocol which is above the IP input and output modules, as incoming and outgoing packets have their protocol changed from TCP to IXP, with the IXP packets being passed back *up* to the modified IP input module.

Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Previously cited Bellemore et al, Vange et al, Soderberg et al, Aviani et al, and Colby et al are cited for disclosing pertinent information related to the claimed invention. Applicants are requested to consider the prior art reference for relevant teachings when responding to this office action.

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7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregory G. Todd whose telephone number is (571)272-4011. The examiner can normally be reached on Monday - Friday 9:00am-6:00pm w/ first Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ario Etienne can be reached on (571)272-4001. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.


Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Gregory Todd



Patent Examiner

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